" THE EQUATION OF EXCHANGE " FOR 1911, AND FORECAST

The purpose of the present article is to supplement the statistics of " the equation of exchange " for the United States published a year ago in this REVIEW by including the figures for 1911, and discussing the indications for the future. The equation of exchange, expressed in algebraic symbols,[1] is

$$MV + M'V' = PT.$$

The estimates as calculated independently for these six magnitudes, M, M′, V, V′, P, T, show a remarkable self-consistency, and thus check each other's accuracy. The left side ($MV + M'V'$) is found to be 423 and the right side, PT, to be 420. These agree within ¾ of 1 per cent. In order to eliminate this slight discrepancy, that is, to make all six magnitudes self-consistent, I have, as in previous years, arbitrarily corrected the original estimates. By this mutual adjustment or correction the six magnitudes are made to fulfill the equation of exchange exactly, and each magnitude is assigned its most probable value. The largest adjustment or correction was made, of course, in those magnitudes the first estimates of which were regarded as least trustworthy. The estimated values

[1] M signifies the money in circulation in the United States, exclusive of the amount in the United States Treasury and in banks.

V signifies the velocity of circulation of the money M.

M' signifies the bank deposits of the United States which are subject to check.

V' signifies the velocity, or the rate of turn-over, or what is more familiarly known as the "activity" of the deposits M'.

P signifies the level of prices in the United States in 1911 as compared with the level of 1909 taken as the base year.

T signifies the volume of trade or the number of "units" of goods of all kinds which were exchanged for money or checks in 1911. The "units" here referred to are not bushels, quarts, pounds, tons, etc. ordinarily employed in commerce; but each "unit" is that amount which was worth one dollar in 1909, taken as the "base" year.

From the above definitions, it follows that:

MV signifies the total amount of money expended for goods in 1911, and that

$M'V'$ signifies the total value of the checks expended for goods in 1911, and that

$MV + M'V'$ signifies the grand total of expenditure in 1911 by both money and checks. This grand total is equal to

PT which is the product of the volume of trade of 1911 (in units each worth \$1 in 1909) multiplied by the price level of 1911 (relatively to 1909).

of these six magnitudes, as first calculated (" unadjusted ") and also as afterward mutually corrected (" adjusted ") are as follows:

	M	M'	V	V'	P	T	$MV+M'V'$	PT
Unadjusted	1.64	7.78	21.0	50.0	102.1	411	423	420
Adjusted	1.64	7.78	20.9	49.9	102.2	413	422	422

It will be seen that no one of the six figures as originally calculated needed to be " doctored " by more than ½ of 1 per cent in order to make them all fit together in the equation. The adjustments required in last year's calculations were about the same. Those in previous years were usually greater, although it seldom happened that any magnitude required an adjustment of over one or two per cent. This continued closeness of agreement is itself evidence of the substantial accuracy of the figures, although such surprising closeness of agreement as has been found in the last two years cannot be expected for every year. The " probable error " of several of the six magnitudes must surely exceed 1 per cent. In *The Purchasing Power of Money* (p. 303) the probable error of every magnitude is estimated at more than 1 per cent and as possibly reaching, in some cases, 10 per cent. The probable errors of V and T are the greatest.

It may interest the reader to compare the results of three successive calculations which were made for the year 1911. A first and very rough calculation was made in December, 1911, and used in a paper read before the Round Table Club of St. Louis, on December 12, 1911. At this time, of course, none of the data for 1911 were complete. A second calculation was made in February, 1912, and sent to Mr. Roger W. Babson, forecaster of market conditions. All the data for 1911 were then available except the index number for prices. The third and final calculation, which is here given, was made in March, 1912, after the missing figure for prices was obtained.[2] Of these three calculations, each succeeding one showed

[2] In the first calculation, T was estimated by employing as a very rough "barometer of trade" the gross earnings of railroads (in hundreds of millions of dollars) plus the production of pig iron (in millions of tons). I used this method for lack of any other method readily available at the time and after finding that its results agreed roughly (for the years 1903-10) with those of

a closer agreement (between the two sides of the equation) than its predecessor. In the first calculation the left side of the equation was 410 and the right 368, showing a discrepancy of about 10 per cent. In the second calculation the two sides were 423 and 415 respectively, showing a discrepancy of about 2 per cent, while in the third calculation, as above, the two sides are 423 and 420, showing a discrepancy of less than 3/4 of 1 per cent.

It is further interesting to observe how the independent calculations of the six magnitudes serve to check and correct each other even when individually the estimates are very rough. The mutual adjustment or correction of the six magnitudes may apparently be relied upon to produce, of itself, a certain degree of accuracy, even when many of the original data are themselves inaccurate. Thus the "adjusted" figures of the second calculation agreed almost exactly with those of the third or final calculation. The biggest disagreement was only about 1 per cent, being that for P which in the second calculation was dependent on Bradstreet's index number instead of that of the Bureau of Labor. Even the first of the three calculations (after mutual adjustment of the six magnitudes) showed a remarkable agreement with the third or final calculation, the maximum difference being in M' and T, both of which were about 7 per cent lower in the first calculation than in the third.

The results of the three calculations (*after* mutual adjustment of the six estimates in each case) are as follows:[3]

	M	M'	V	V'	P	T
First Calculation	1.6	7.3	21	50	104	384
Second Calculation	1.64	7.76	20.9	49.7	101	416
Third Calculation	1.64	7.78	20.9	49.9	102.2	413

the much more exact as well as much more laborious method which had been used in the *Purchasing Power of Money*. This latter method was employed in the second and third calculations as shown more fully in the Appendix below.

[3] The money (M) was calculated from substantially the same data in all three calculations, the low result in the first calculation being due to the process of "adjustment," the unadjusted estimate being 1.63. The value of M' in the first calculation (which, unadjusted, was 7.4) was obtained simply by taking 46.8 per cent of the total "individual deposits" (15.9), this percentage being a surmise based on the known percentage for 1909 (viz. 48.2) and 1910 (viz. 47.5)

Taking into account all available considerations, I venture to feel confident that the figures for 1911 obtained by the third calculation are very nearly correct—those for M and M' being, in my opinion, correct within 1 per cent; those for V' and P within 2 per cent and those for V and T, within 5 per cent.[4]

Adding the figures thus found for 1911 to those found for 1896-1910 we obtain the following table showing the best available estimates of the six magnitudes in the years 1896 to 1911 inclusive:

Year	M	M'	V[5]	V'[5]	P	T
1896	.88	2.71	19	37	60.3	191
1897	.90	2.86	20	39	60.4	215
1898	.97	3.22	20	41	63.2	237
1899	1.03	3.88	22	42	71.6	259
1900	1.18	4.44	20	38	76.5	253
1901	1 22	5.13	22	41	80.5	291
1902	1.25	5.40	22	41	85.7	287
1903	1.39	5.73	21	40	82.6	310
1904	1.36	5.77	20	40	82.6	310
1905	1.45	6.54	22	43	87.7	355
1906	1.58	6.81	22	46	93.2	375
1907	1.63	7.13	21	45	93.2	384
1908	1.62	6.57	20	45	90.3	361
1909	1.61	6.68	21	53	100.0	387
1910	1.64	7.23	21	53	104.0	399
1911	1.64	. 8	21	50	102.2	413

and assuming the same decrease in the following year. The second and third calculations of M' were the same and are given in full in the Appendix below. The calculations for V are all merely rough estimates obtained as explained in the Appendix. The method of estimating V' is the same in all three calculations (except that the first estimate required a guess for the clearings for the then unexpired part of 1911) and is explained in the Appendix. P, which in the first calculation was 101 (before adjustment), was simply taken as 3 per cent lower than the 104 of 1910, because Bradstreet's index numbers (for the eleven months of 1911 then elapsed) indicated that decline. The second calculation was based on Bradstreet's full figures for 1911 supplemented by the index numbers for prices of stocks as given in Babson's "desk sheet" (the index number of stock prices being "weighted" one tenth as heavily as Bradstreet's index number of commodity prices).

[4] For the details of the calculation see the Appendix.

[5] The figures for velocity of circulation are here given without decimals as it is believed that two significant figures exhaust, or nearly exhaust the degree of accuracy which can be claimed for these results. But in the Appendix the calculation is carried one place further and these closer calculations are of course the ones used in the multiplications by which the total values of the two sides of the equation are calculated.

The folding diagram shows graphically the change in all of the six magnitudes in the "equation of exchange" from 1896 to 1911 inclusive. By folding the diagram in various ways it is easy to place the balance of 1911 immediately under that of 1896 or of any other particular year and thus make a direct ocular comparison for each of the six magnitudes. Any two years can be directly compared in this manner.

The preceding table gives the figures for each of the six magnitudes separately. The following table shows the values of certain derivative magnitudes:

	Money Expenditure MV	Check Expenditure $M'V'$	Total Expenditure $MV+M'V'$ & PT	Money Expenditure as percentage of total $\frac{MV}{MV+M'V'}$	Check Expenditure as percentage of total $\frac{M'V'}{MV+M'V'}$	Deposits relative to Money $\frac{M'}{M}$	Virtual Velocity of Money including money in banks $\frac{MV+M'V'}{M+R^*}$
1896	16	99	115	14	86	3 1	80
1897	18	112	130	14	86	3.2	84
1898	20–	131–	150	13	87	3.3	89
1899	22	163	185	12	88	3.8	103
1900	24	170	194	12	88	3.6	99
1901	27	208	235	11	89	4.2	114
1902	27	219	246	11	89	4.3	115
1903	29	227	256	11	89	4.1	113
1904	28	228	256	11	89	4.2	107
1905	31+	279+	311	10	90	4.5	125
1906	34	315	349	10	90	4.3	132
1907	35	323	358	10	90	4.4	129
1908	32	294	326	10	90	4.0	107
1909	34	353	387	9	91	4.1	124
1910	34	381	415	8	92	4.4	134
1911	34	388	422	8	92	4.7	131

* R = money in banks. Thus the "virtual velocity" of circulation of money is the quotient of the total expenditure (by money and checks) divided by the total money in use (in circulation and in banks).

Comparisons and Outlook

Comparing now the figures for 1911 with those for 1910 we see that conditions have changed very little. The total expenditure increased from an estimated 415 billions of dollars in 1910 to an estimated 422 billions in 1911, that is, less than 2 per cent and about equal to the growth of population. The amount of *money* expended has remained the same, 34 billions. The amount of *checks*

expended increased from an estimated 381 billions to an estimated 388 billions or less than 2 per cent. One of the two factors of which this check expenditure consists (the volume of deposits subject to check) increased about $7\frac{1}{2}$ per cent, but the other factor (the activity of these deposits) decreased almost as much, viz., about 6 per cent. In like manner, on the other side of the equation, the volume of trade increased slightly, nearly 4 per cent. As the net result of these changes in MV, $M'V'$ and T, prices fell about 2 per cent.

Thus only two of the six magnitudes increased during the year, viz., deposits, M', and trade, T, and only one of these two, M', increased at a rate equal to its average rate of increase in previous years. Money in actual circulation, M, has remained unchanged while the activity of deposits, V', and presumably that of money, V, has declined, as has the price level, P. These changes fairly fulfill, except in one respect,[6] the forecast for 1911 made in my article a year ago.[7]

We see that money expenditure constitutes 8 per cent of the total expenditure, the other 92 per cent being by check. These are the same figures as for 1910, the lowest for cash and highest for checks in the table. We note that deposit currency is now nearly five times money in circulation, this ratio (4.7) being the high-

[6] M' instead of being the most affected by the general contraction proved to be the least.

[7] Referring to the diagram, it was then said:

"At the present writing the best indications seem to point to the conclusion that the year 1911 will show a general contraction, that is, a shrinkage of the weights in our mechanical balance, (especially M') and their movement toward the fulcrum—and this without a disturbance sufficiently acute to be called a crisis. However, it seems also probable, in view of all the circumstances of the case, and especially of the progressive increase in the gold supply, that the upward trend of prices and the tendency toward expansion of trade, and of money and deposits with their velocities, will be resumed within a year or two, continuing until the process does culminate in a crisis. In other words, in spite of the apparently impending recession, we are still in a period of incubation for a future crisis. The exact date of such a crisis, of course, it would be foolish to predict, but if it occurs at all, it would seem likely to occur between, say 1913 and 1916. This prognostication is, of course, purely tentative and based chiefly on the existence of the expansive tendency shown in the diagram and the fact that such a tendency led to the crisis of 1907 and, so far as our fragmentary knowledge allows us to judge, to the crises of 1857, 1866 and 1873."

est yet reached and the only indication in our figures of overdistension in 1911 as compared with 1910. This ratio, therefore, will not probably increase next year and is likely to decrease. The last column of the last table shows the total expenditure to be 131 times the total money in use in the United States (*i. e.*, including that in banks, but excluding that in the United States Treasury). This is the number of times a year which this money would need to be turned over in order to perform the total exchange work, and may therefore be called the virtual velocity of circulation of money. The figure (131) for 1911 is, next to that (134) for 1910 and that (132) for 1906, the highest in the table.

It would appear that the increase in deposits has been due to the great importation of gold during 1911. This has found its way first into the vaults of banks and has been used by them as a means of inducing their customers by low rates of interest to extend their loans, although the amounts loaned have been left on deposit and not used quite as actively as in 1910. At any rate the facts of 1911—(1) great imports of gold, (2) low rates of discount on bank loans, (3) increase in bank reserves, and (4) increase in loans and deposits—are facts which, on the above theory, fit well together.

Since in general all the factors, M, M', V, V', and T, which determine the price level tend to increase from year to year and since the increase in the volume of trade, T, tends to *decrease* the price level, P, we may classify the five price determining factors into price-*raising* factors (M, M', V, V') and a price-*depressing* factor (T). Among the price-raising factors, one (M') is not independent of the others but tends to rise or fall directly with M.[8] Only the *ratio* M'/M *i.e.*, deposits considered *relatively* to money, is an independent price-raising factor. Thus these four independent price-raising factors are: money in circulation (M), deposits subject to check, considered as a multiple of money in circulation (M'/M), and their velocities of circulation (V and V').

In last year's article the relative importance of the four independent price-raising factors (money M, its velocity V, deposits *relatively* to money M'/M and their velocity V') was gauged by calculating what the price level *would have been* had it not been for the increase in any particular factor. It was found, in this way,

[8] See *Purchasing Power of Money*, ch. 3.

that M was far more important as a price-raising factor than any one of the other three.[9]

In these comparisons the increase of deposit currency (relatively to money) and the increase of its velocity or activity are treated as separate causes. Let us now consider the combined effect of these *two* causes, which together constitute the *use of checks.* Had it not been for the increased use of checks, ($M'V'$) relatively to money (M), the price level of 1911, instead of being what it actually was, would have been 48 per cent lower; while, on the other hand, had it not been for the increase in money in circulation, the price level would have been 39 per cent lower. Consequently the increasing use of checks (relatively to the money in circulation) was, in the United States, a more important price-raising factor than the increase of money.

Considering the problem internationally, however, we must remember that the extraordinary expansion or inflation of credit currency in the United States tended toward producing an export of gold or at any rate to restrain the import of gold, just as, in the Civil War, the greenback inflation tended more effectively in the same direction. For the world as a whole, the increased use of checks (relatively to money) was doubtless a less potent price-raising influence than the increase of money. But the increased use of checks as will be shown in another article (to be published in September) must be reckoned with in the future by all nations—a fact usually overlooked by those who foresee a cessation of the rise in prices with a cessation in the increase of gold production.

It is interesting to observe that, although in 1911 the price level in the United States fell slightly, the price level of the world as a whole evidently rose. This is shown at least by the statistics of Canada, England, France and Germany. That American prices should have moved in the opposite direction from foreign prices is not surprising when we consider that, for a number of years, American prices had been rising more rapidly than foreign prices. The fact that the movements of prices at home and abroad in 1911 were in opposite directions tends simply to reëstablish the former relative levels at home and abroad. It is true that this tendency to reëstablish the international balance of price levels might have

[9] Because in particular, M not only affects the term MV, but also affects the term $M'V'$. Thus if M doubles while deposits (M') remain the same *relatively* to M, evidently deposits (M') will double also.

been expected to cause gold to be exported from America, where prices have been unduly high, to foreign countries, where they have been, relatively speaking, low; while, as a matter of fact, gold was largely imported in 1911. But it is reasonable to suppose that gold would have been imported in even greater abundance had the relative price levels not been as they were. The export or import of gold, as is well known, is sensitive to a number of causes. Among the causes which would tend in the direction of causing imports were the heavy exports of commodities, and we find, in fact, that the export of commodities in 1911 was large—larger than in any previous year. The explanation of these large exports seems to lie in the scarcity of food products abroad, where the drought of last summer was more felt even than here, and in the great American production of cotton and petroleum, which make up between a quarter and a third of all our exports. These increased in supply and decreased in price.[10]

The general fall, therefore, in American prices, when taken in connection with the general rise in prices abroad does not seem to indicate any widespread or permanent arrest in the general upward trend, although many writers are using this recession as an argument to prove such an arrest. These writers point out that the production of gold promises to cease increasing. In view of all the evidence, however, I am strongly inclined to the belief that the upward trend of prices will continue for many years although it would not be surprising if the present lull should last through 1912. Taking all things into consideration, the outlook for the next year or two in the United States would appear to be for a reduction of gold imports, a slackening in the growth of bank reserves and deposits (M'); and an increase of money in circulation (M), both absolutely and relatively to deposits. The activity of deposits seems likely to remain excessive and the volume of trade to increase slightly. The net result will probably be a slight rise in prices. In short, the outlook is for a slight general expansion.

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[10] That the prices of exports have greatly fallen from 1910 to 1911 is clear. The quantities of exports rose, as the Appendix to this article shows, about 25 per cent, while the value of exports only rose about 7½ per cent. This would indicate a fall in prices of goods exported of 14 per cent. The corresponding figures for imports indicate a rise of prices of about 1 per cent.

APPENDIX

The details of the calculations for the six magnitudes in the equation of exchange for the United States in 1911 and their mutual adjustment are as follows:[11]

M (Money in circulation in the United States outside of banks and the United States Treasury): Data are from the *Report of the Comptroller of the Currency* for 1911:

Total Money in U. S. (p. 61)........		3.56 billions
Deduct Money in U. S. Treasury (p. 61)	.34 bill.	
Money in banks reported (p. 35)	1.55 "	
Estimated money in non-reporting banks[12]	.03 "	
	1.92 "	1.92 "
Money in actual circulation		1.64 "

M' (Deposits subject to check): Data are also from the Comptroller's *Report*:

Deposits subject to check June 7, 1911 (p. 57)		8.20 billions
Applying the following four items of correction:		
(a) For "Savings Deposits" improperly included[13]	— .32 bill.	
(b) "Exchanges for Clearing House" (p. 35)	— .36 "	
(c) Island Possessions (p. 788)....	— .03 "	
(d) Nonreporting Banks[14]	+ .29 "	
	— .42 "	.42 "
Revised estimate of deposits subject to check		7.78 "

[11] My thanks are due to many persons for providing me with data. I wish to express my obligations in particular to Mr. Lawrence O. Murray, the Comptroller of the Currency, Dr. Charles P. Neill, Commissioner of Labor, Mr. O. P. Austin, Chief of the Bureau of Statistics, and Professor Wesley Clair Mitchell, for their kindness in supplying me with statistics, most of them being in advance of publication.

[12] Estimated on the assumption that the money in non-reporting banks (x) bears the same ratio to their estimated individual deposits (.56, p. 37) as the total reported money in other than national banks (.56, p. 61) bears to the total reported individual deposits in these banks (10.4, p. 56); so that $x = \frac{.56}{10.4} \times .56 = .03$.

[13] Estimated at ½ "savings deposits in national banks, $637,000,000, included with the individual deposits and certificates of deposits" (p. 57, footnote 2).

[14] Estimated on the assumption that the deposits subject to check of non-reporting banks (x) bear the same ratio to the total reported deposits subject to check (8.20, p. 57) as the estimated individual deposits of non-reporting

V (Velocity of circulation of money): The calculations are based on those in *The Purchasing Power of Money,* p. 478. They all rest on original data for two dates, in 1896 and 1909.

V for 1910 would be 21.7 [15] or 21.2 [16] of which the average is 21.4.

V for 1911 would be 21.9 [15] or 20.2 [16] of which the average is 21.0.

$M'V'$ (Check circulation in the United States): Data are from the *Financial Review.*

(1)	New York Clearings (2)	Outside Clearings (3)	Crude Barometer (2)+5x(3) (4)	Corrective Ratio (5)	Refined Barometer of check transactions (4)×(5) (6)	Reduced by proportion to agree with the final estimate for 1910 =381 billions (7)
1910	97.3	66.4	429	.89½[17]	384	381
1911	92.3	67.7	431	.91[17]	392	389

V' (Activity of deposits subject to check): Check circulation for 1911 (Estimated above) .... 389 billions

Deposits subject to check, 1911 (estimated above).. 7.78 "

Estimated V' $\dfrac{389}{7.78} = 50$ times a year.

P (The price level of 1911 relatively to 1909): The calculations for P are based chiefly on the index numbers of the United States Bureau of Labor for 257 commodities (wholesale prices). These are supplemented by the index number for the prices of 40 stocks worked out by Professor Wesley Clair Mitchell and the two are averaged by the process employed last year and in the *Purchasing Power of Money.* The results are as follows:

	Wholesale prices 257 commod.	(1) Per cent.	40 stocks	(2) Per cent.	Average: $\frac{10\,(1)+(2)}{11}$	Reduced to 1909 as base year
1910	131.6	100	254	100	100	104.0
1911	129.3	98.2	248	97.6	98.1	102.1

Note 14 continued: banks (.56, p. 37) bear to the total reported individual deposits (15.9, p. 35), so that $x = \frac{.56}{15.9} \times 8.20 = .29$.

[15] If V increased at the same rate that it did between 1896 and 1909 (from 18.6 to 21.5).

[16] If $MV+M'V'$ decreased at the same rate that it did between 1896 and 1909 (from 16.7 per cent to 9.6 per cent).

T (Volume of Trade): This is estimated by applying to the final estimate for 1910 the percentage of growth from 1910 to 1911. This percentage of growth is a weighted average percentage growth of the *quantities* of goods exchanged in the two years. An average growth ratio is obtained for five groups, viz., (1) goods in internal commerce, (2) goods imported, (3) goods exported, (4) cars handled, and (5) par values of shares of stocks sold. The last two contain no price element. The price element in the first three is eliminated by taking the *quantities* in both years and multiplying by weights, which are the same for both years. These weights are taken as roughly equal to the prices of either year. The data are from the *Monthly Summary of Commerce and Finance* of the United States and those for stocks from Babson's desk sheet.

The detailed data upon which the foregoing calculations are based will be found on the following pages:

[17] Based on the rate of change indicated by the figures for 1896-1909. (See *Purchasing Power of Money*, p. 448.)

The articles used for internal commerce were:

				1910 Quantity (in mill.)	1910 Value (in mill.)	1911 Quantity (in mill.)	1911 Value (in mill.)
Cattle	(received at 7 cities)	at $55.00 per	head	9.3	511.5	8.8	484.0
Cattle	" " 8 "	" 55.00 "	"	2.3	126.5	2.0	110.0
Cattle	" " 4 "	" 55.00 "	"	1.1	60.5	1.1	60.5
Calves	" " 5 "	" 8.00 "	"	1.0	8.0	1.0	8.0
Calves	" " 5 "	" 8.00 "	"	.5	4.0	.4	3.2
Calves	" " 4 "	" 8.00 "	"	.6	4.8	.7	5.6
Hogs	" " 7 "	" 23.00 "	"	15.7	361.1	20.8	478.4
Hogs	" " 8 "	" 23.00 "	"	4.8	110.4	6.2	142.6
Hogs	" " 4 "	" 23.00 "	"	3.3	75.9	4.0	92.0
Sheep	" " 7 "	" 5.50 "	"	12.4	68.2	13.6	74.8
Sheep	" " 8 "	" 5.50 "	"	2.3	12.7	2.5	13.8
Sheep	" " 4 "	" 5.50 "	"	3.2	17.6	3.9	20.9
Horses and mules	" " 7 "	" 75.00 "	"	.4	30.0	.5	37.5
Horses and mules	" " 6 "	" 75.00 "	"	.1	7.5	.1	7.5
Wheat	" " 16 "	" 1.10 "	bu.	272.0	299.2	262.6	288.9
Wheat	" " lakeports	" 1.10 "	"	36.7	40.4	41.9	46.1
Wheat	" " 6 seaports	" 1.10 "	"	42.5	46.8	68.6	75.5
Corn	" " 16 cities	" .70 "	"	244.3	171.0	254.5	178.2
Corn	" " lakeports	" .70 "	"	32.3	22.6	38.0	26.6
Corn	" " 6 seaports	" .70 "	"	38.8	27.2	51.6	36.1
Oats	" " 16 cities	" .35 "	"	218.3	76.4	197.3	69.1
Oats	" " lakeports	" .35 "	"	20.7	7.2	22.6	7.9
Oats	" " 6 seaports	" .35 "	"	40.0	14.0	43.6	15.3
Barley	" " 14 cities	" .65 "	"	80.9	52.6	76.4	49.7
Barley	" " lakeports	" .65 "	"	13.8	9.0	10.1	6.6
Barley	" " 6 seaports	" .65 "	"	15.2	9.9	16.1	10.5
Rye	" " 15 cities	" .75 "	"	7.4	5.6	9.6	7.2
Rye	" " lakeports	" .75 "	"	1.0	.8	2.2	1.7
Rye	" " 6 seaports	" .75 "	"	.9	.7	1.1	.8

						Quantity (in mill.)	Value (in mill.)	Quantity (in mill.)	Value (in mill.)
Grain	(shipped via trunk line)	at	.60	per	bu.	126.3	75.8	122.1	73.3
Flaxseed	(received at 7 cities)	"	2.50	"	"	14.0	35.0	13.7	34.3
Flaxseed	" " lakeports	"	2.50	"	"	3.1	7.8	4.5	11.3
Flour	" " 13 cities	"	5.50	"	bbl.	24.6	135.3	21.8	119.9
Flour	" " 6 seaports	"	5.50	"	"	16.6	91.3	17.7	97.4
Flour	(shipped via trunk lines)	"	5.50	"	"	4.2	23.1	2.9	16.0
Flour	(received at lakeports)	"	5.50	"	"	12.0	66.0	12.0	66.0
Cotton	" " 3 cities	"	75.00	"	bale	.7	52.5	.7	52.5
Cotton	(total in sight)	"	75.00	"	"	8.4	630.0	9.5	712.5
Cotton	(received at 29 towns)	"	75.00	"	"	4.3	322.5	5.0	375.0
Cotton	" " seaports)	"	75.00	"	"	6.1	457.5	7.1	532.5
Coal	(anthracite shipments)	"	6.00	"	ton	64.9	389.4	70.0	420.0
Coal	(received at 2 cities)	"	6.00	"	"	.2	1.2	.2	1.2
Coal	" " lakeports)	"	6.00	"	"	4.2	25.2	4.4	26.4
Coal	(bituminous, received at 7 cities)	"	3.00	"	"	13.9	41.7	12.0	36.0
Coal	" " " lakeports	"	3.00	"	"	18.4	55.2	17.1	51.3
Coal	" (hauled by 12 R. R.'s)	"	3.00	"	"	141.9	425.7	144.6	433.8
Coke	" " " "	"	2.00	"	"	27.5	55.0	22.3	44.6
Coke	(from Connellsville)	"	2.00	"	"	18.7	37.4	16.3	32.6
Coke	(received from 2 cities)	"	2.00	"	"	.9	1.8	.9	1.8
Pig iron	(output)	"	18.00	"	"	26.9	484.2	23.3	419.4
Pig iron	(received at 2 cities)	"	18.00	"	"	.5	9.0	.5	9.0
Iron ore	" " lakeports	"	3.00	"	"	41.4	124.2	31.1	93.3
Fruit	" " 2 cities	"	.01	"	lb.	197.3	2.0	205.0	2.1
Lumber	" " lakeports	"	.021	"	ft.	1208.0	25.4	1164.0	24.4
Lumber	(shipped from Mississippi and Wisconsin valleys)	"	.021	"	"	1186.0	2.5	1258.0	2.6
Lumber	" " 7 seaports	"	.021	"	"	661.8	14.0	639.0	13.5
Lumber	(shipments Pacific N. W.)	"	.021	"	"	849.0	17.8	656.9	13.8
						Total	5635.6		5908.3
						Per cent	100%		105%

The articles used for exports were:

					1910 Quantity (in mill.)	1910 Value (in mill.)	1911 Quantity (in mill.)	1911 Value (in mill.)
Cattle	at	$85.00	per	head	.1	9.4	.2	13.9
Hams and shoulders	"	.12	"	lb.	131.0	15.7	190.0	22.8
Salt pork	"	.10	"	"	41.5	4.2	50.9	5.1
Fresh beef	"	.10	"	"	55.5	5.6	28.8	2.9
Canned beef	"	.11	"	"	11.5	1.3	11.2	1.2
Bacon	"	.13	"	"	128.0	16.6	198.0	25.7
Lard	"	.12	"	"	369.0	44.3	552.0	66.2
Butter	"	.24	"	"	3.1	.7	6.4	1.5
Sole leather	"	.21	"	"	38.6	8.1	42.7	9.0
Boots and shoes	"	1.70	"	pair	7.8	13.3	8.5	14.5
Raw cotton	"	70.00	"	bale	7.1	497.0	8.6	603.0
Cotton cloth	"	.07	"	yard	296.0	20.7	410.0	28.7
Corn	"	.60	"	bu.	42.7	25.6	61.6	37.0
Wheat	"	1.00	"	"	24.3	24.3	32.7	32.7
Flour	"	5.00	"	bbl.	8.4	41.9	11.3	56.5
Tobacco leaf	"	.11	"	lb.	324.0	35.6	366.0	40.3
Timber	"	23.00	"	M. ft.	.4	10.2	.5	11.0
Wood pulp	"	.02	"	lb.	16.7	.3	19.0	.4
Linseed oil (cake)	"	.015	"	"	656.0	9.8	526.0	7.9
Refined illuminating oil	"	.06	"	gal.	940.0	56.4	1110.0	66.6
Cottonseed oil	"	.07	"	lb.	177.0	12.4	323.0	22.6
Coal (anthracite)	"	5.00	"	ton	3.0	15.1	3.6	17.8
Coal (bituminous)	"	2.50	"	"	10.8	27.0	13.9	34.8
Copper	"	.13	"	lb.	708.0	92.0	787.0	102.0
Steel rails	"	30.00	"	ton	.4	10.6	.4	12.6
Sheets and plates	"	.02	"	lb.	615.0	12.3	834.0	16.7
Boards, planks, and deals	"	22.00	"	M. ft.	1.9	41.8	2.2	48.8
Structural iron and steel	"	45.00	"	ton	.1	6.6	.2	10.0

					Quantity (in mill.)	Value (in mill.)	Quantity (in mill.)	Value (in mill.)
Wire	at	.025	per	lb.	385.0	9.6	515.0	12.9
Pipes and fittings	"	.025	"	"	349.0	8.7	442.0	11.1
Rosin	"	6.00	"	bbl.	2.3	13.6	2.4	14.5
Spirits of turpentine	"	.60	"	gal.	14.3	8.6	18.2	10.9
Lubricating and heavy paraffine oil	"	.13	"	"	164.0	21.3	183.0	23.8
Oleo oil	"	.10	"	lb.	105.0	10.5	163.0	16.3
Cottonseed oil (cake)	"	.015	"	"	739.0	11.1	1030.0	15.5
Automobiles	"	1200.00	"	unit.	.008	10.1	.016	19.0
					Total	1152.3		1436.2
					Per cent	100%		125%

Articles used for imports were:

					1910		1911	
Cotton (unmanufactured)	at $	.20	per	lb.	85.3	17.1	101.0	20.2
Cotton cloth	"	.15	"	sq. yd.	55.2	8.3	52.0	7.8
Rice	"	.02	"	lb.	225.0	4.5	194.0	3.9
Boards (sawed lumber)	"	18.00	"	M. ft.	.9	17.0	.8	15.0
Bituminous coal	"	3.00	"	ton	2.0	6.0	1.2	3.7
Coke	"	4.00	"	"	.2	.6	.7	.3
Pig iron	"	27.00	"	"	.2	6.4	.1	4.0
Wheat	"	.90	"	bu.	.1	.1	1.4	1.2
Wheat flour	"	4.00	"	bbl.	.2	.8	.1	.5
Oats	"	.40	"	bu.	.8	.3	.1	.0
Flaxseed	"	2.00	"	"	9.0	18.0	7.0	14.0
Cocoa (crude)	"	.10	"	lb.	116.0	11.6	134.0	13.4
Cocoa or chocolate (unmanufactured)	"	.25	"	"	2.7	.7	2.8	.7
Tea	"	.20	"	"	98.0	19.0	104.0	20.8
Coffee	"	.10	"	"	804.0	80.4	800.0	80.0
Cane sugar	"	.03	"	"	4190.0	125.7	4100.0	123.0

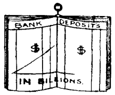
					1910 Quantity (in mill.)	1910 Value (in mill.)	1911 Quantity (in mill.)	1911 Value (in mill.)
Lemons	at	.02	per	lb.	150.0	3.0	130.0	2.6
Bananas	"	.30	"	bunch	40.0	12.0	45.0	13.5
Cheese	"	.15	"	lb.	44.0	6.6	45.0	6.8
Distilled spirits	"	1.50	"	gal.	4.0	6.0	3.3	5.0
Sparkling wines	"	16.00	"	doz. qts.	258.0	4.1	252.0	4.0
Leaf tobacco	"	.60	"	lb.	42.0	25.0	53.0	32.0
Woolen dress goods	"	.20	"	sq. yd.	42.0	8.4	21.0	4.2
Raw silk	"	3.00	"	lb.	22.0	66.0	21.0	63.0
Hides, skins	"	.20	"	"	460.0	92.0	424.0	84.8
India rubber	"	1.00	"	"	90.0	90.0	82.0	82.0
Raw wool	"	.20	"	"	180.0	36.0	155.0	31.0
Tin	"	.30	"	"	105.0	32.0	107.0	32.0
Copper (manufactures of)	"	.12	"	"	259.0	31.0	266.0	32.0
Nitrate soda	"	32.00	"	ton	.5	17.0	.6	18.0
Bristles	"	.90	"	lb.	3.7	3.3	3.2	2.9
Clays, earth	"	7.00	"	ton	.3	2.0	.3	2.3
Macaroni	"	.04	"	lb.	113.0	4.5	117.0	4.7
Cement	"	.40	"	100 lbs.	1.2	.5	.7	.3
Mineral oil	"	.05	"	gal.	24.0	1.2	69.0	3.4
Molasses	"	.04	"	"	28.0	1.1	26.0	1.0
Wood (pulp)	"	.01	"	lb.	1000.0	10.0	1125.0	11.3
Beans	"	1.70	"	bu.	1.0	1.7	.9	1.4
Cigars and cigarettes	"	3.00	"	lb.	2.0	6.0	1.3	4.0
Spices	"	.08	"	"	52.0	4.2	58.0	4.6
Paper	"	.02	"	"	115.0	2.3	119.0	2.4
Lead	"	.02	"	"	217.0	4.3	180.0	3.6
Iron ore	"	3.00	"	ton	2.6	7.8	1.8	5.4
					Total	794.0		766.0
					Per cent	100%		96%

The results showed an increase of 5 per cent in the quantities of goods in internal commerce as between 1910 and 1911, a decrease of 4 per cent in the quantities of goods imported, an increase of 25 per cent in the quantities of goods exported, an increase of 11 per cent in the combined quantities exported and imported, a decrease of 10 per cent in the cars handled and of 23 per cent in the shares sold. These percentages were then weighted according to the scale used last year and in the *Purchasing Power of Money,* the weights being 20 for internal commerce, 3 for exports and imports combined, 2 for cars handled and 1 for shares.[18] The result of this averaging is an increase of 3 per cent.

[18] The reasons for this selection of weights are given in *The Purchasing Power of Money,* p. 485. See also p. xxii.

... of the U. S. Treasury and the banks). It is usually between one and two billions.

The leverage of this purse, or its distance from the fulcrum, represents V, the velocity of circulation of money. Money usually turns over about twenty times a year.

The weight 

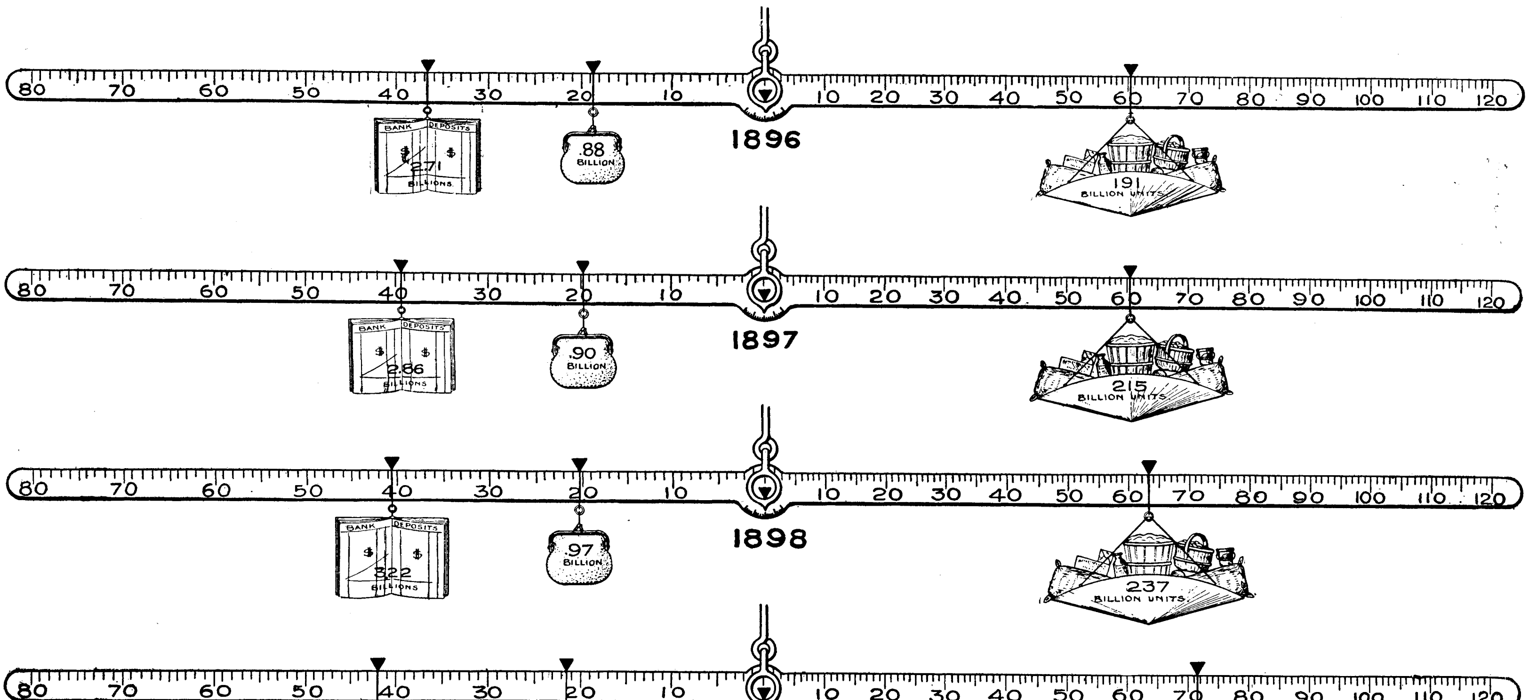
symbolizing a bank book, represents M', the bank deposits against which checks are drawn (usually from three to eight billions).

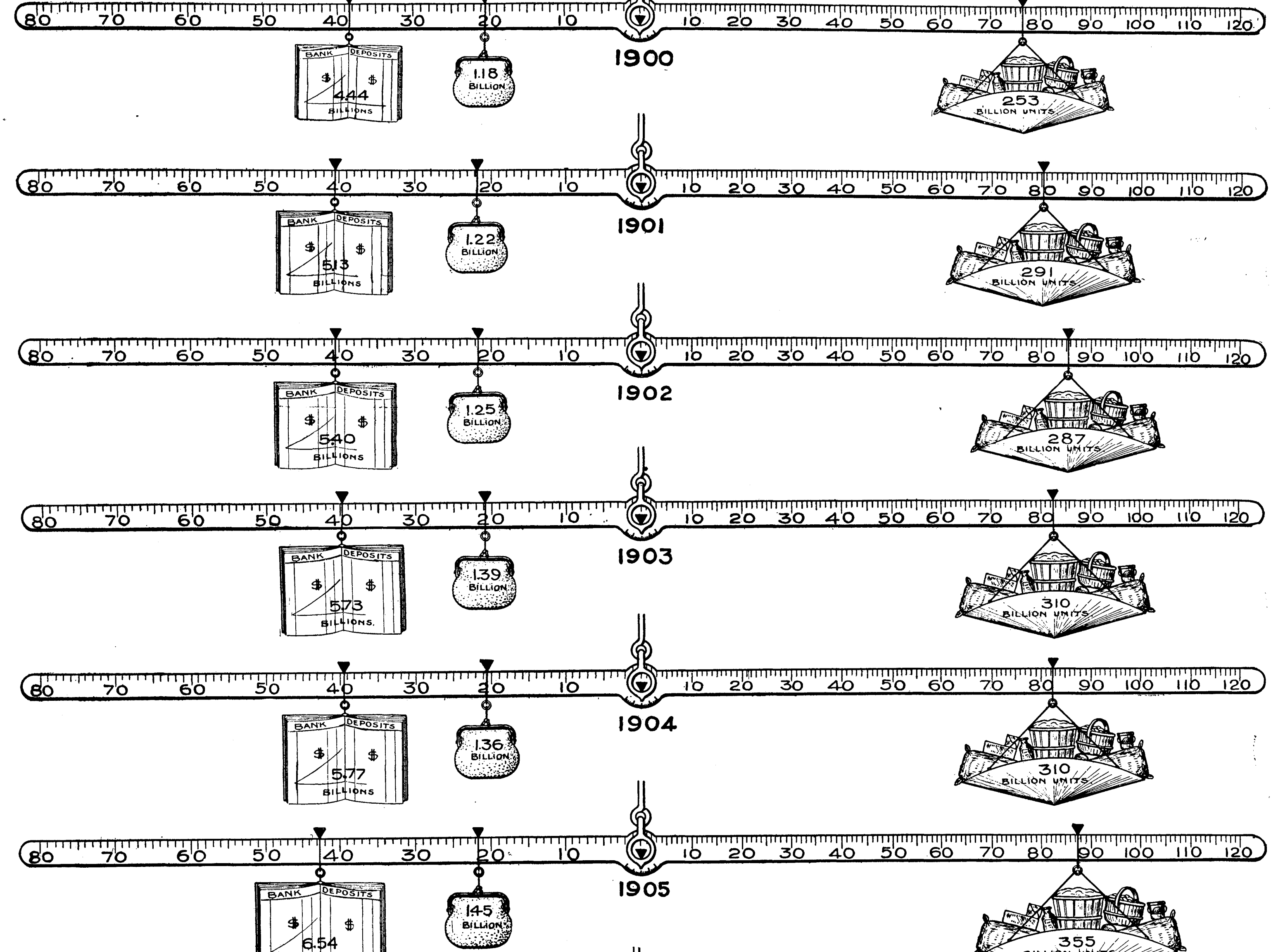
The leverage of this bank book represents V', the velocity of circulation ("activity") of these deposits. The deposits are usually turned over from forty to fifty times a year.

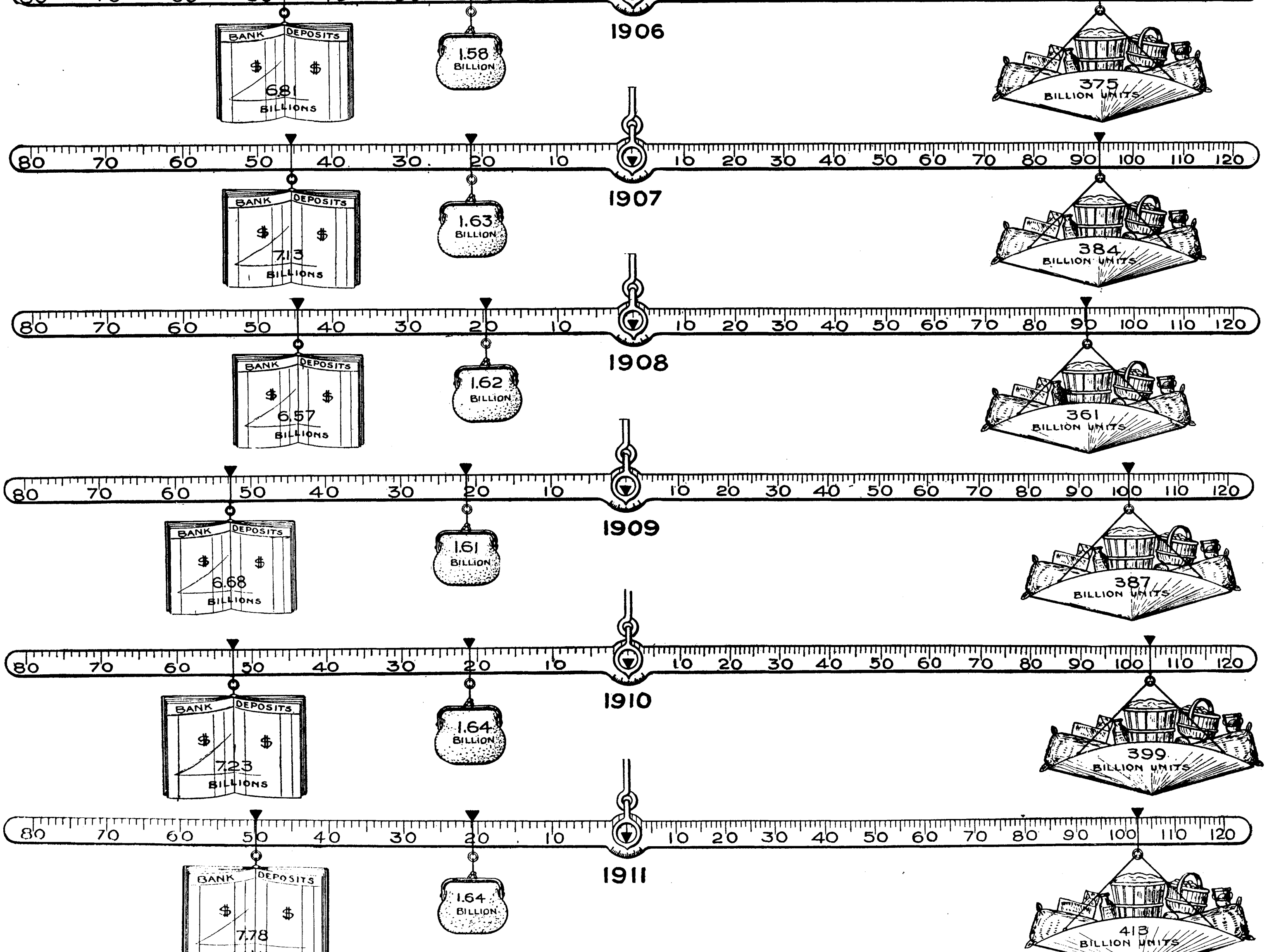
The weight 

symbolizing a grocer's tray, represents T, the volume of trade expressed in "units," each "unit" being the quantity which could be purchased for $1 in 1909.

The leverage of this tray represents P, the index number of prices measured as a percentage of the prices of 1909.




1900
BANK DEPOSITS
4.44 BILLIONS
1.18 BILLION
253 BILLION UNITS
1901
BANK DEPOSITS
5.13 BILLIONS
1.22 BILLION
291 BILLION UNITS
1902
BANK DEPOSITS
5.40 BILLIONS
1.25 BILLION
287 BILLION UNITS
1903
BANK DEPOSITS
5.73 BILLIONS.
1.39 BILLION
310 BILLION UNITS
1904
BANK DEPOSITS
5.77 BILLIONS
1.36 BILLION
310 BILLION UNITS
1905
BANK DEPOSITS
6.54
1.45 BILLION
355



1906
BANK DEPOSITS
6.81 BILLIONS
1.58 BILLION
375 BILLION UNITS
1907
BANK DEPOSITS
7.13 BILLIONS
1.63 BILLION
384 BILLION UNITS
1908
BANK DEPOSITS
6.57 BILLIONS
1.62 BILLION
361 BILLION UNITS
1909
BANK DEPOSITS
6.68 BILLIONS
1.61 BILLION
387 BILLION UNITS
1910
BANK DEPOSITS
7.23 BILLIONS
1.64 BILLION
399 BILLION UNITS
1911
BANK DEPOSITS
7.78
1.64 BILLION
413 BILLION UNITS